2-1 GENERAL

This chapter provides procedures to aid in development of functional requirements and subsequent preparation of planning and programing documents. The ACES program is the planning base for developing requirements which are eventually embodied into a building program. This chapter discusses building program development, and in particular, how to determine space needs and related requirements for site improvements, furnishings and equipment.

2-2 ACES: THE PLANNING BASE.

The ACES is an integrated management system of voluntary educational opportunities. It helps soldiers to grow professionally within the Army and to transfer knowledge and skills gained to productive postservice employment. It is also an Army-Wide System of relatively uniform educational opportunities, decentralized to post level, and operated within HQDA policies. The composition and size of the instructional program projected over the next 10 years for each particular case will be the basis for delineating functional requirements.

a. INSTRUCTIONAL PROGRAMS. Most military installations have authorized ACES instructional progams for a wide range of needs and backgrounds. These programs are described below:

(1) Basic Skills Education Programs (BSEP). This includes basic literacy skills thru 5th grade level, educational skills thru 9th grade level, and educational skills for progression past E-5.

(2) High School Completion Program (HSCP). This gives soldiers a chance to earn a high school diploma or a State-issued high school equivalency certificate or diploma during off-duty hours. Soldiers may enroll, with Army tuition assistance in locally available high school completion programs.

(3) Associate Degree Program. Normally, student is awarded an associate degree for successful completion of an academic or technical course of study at a two-year community or junior college.

(4) Servicemen's Opportunity Colleges Associate Degree. This program allows maximum acceptance toward a degree of non-traditional learning experiences. The soldier can meet degree requirements with a minimum of 15 semester hours of resident credit taken at any time during the program.

(5) Baccalaureate and Graduate Degree Programs. Successful completion of these programs result in the award of bachelor's and or master's (or doctorate) degrees. Each post is encouraged to have at least one of each of these programs available either on-post or within reasonable commuting distance.

(6) Skill Recognition Programs. These voluntary programs show ways to get recognition within the civilian sector for skills soldiers learn in the Army. This includes: Accreditation of Military Experience, Army Apprenticeship, Industry Recognition, Industry Specialists and Certification.

2-2 ACES: THE PLANNING BASE. (cont'd)

(7) Skill Development Programs. These programs provide technically oriented courses in support of enlisted military occupational speciality development or in furthering vocational technical development to qualify for certification, to develop a skill that is both Army and civilian related, or to build academic credits toward associate degree requirements.

(8) Language Program. This includes training to develop simple, survival-level language skills, refresher and maintenance language courses to keep and to upgrade general language skills of those with basic linguist qualifications; duty or mission-related language instruction that improves specific job performance; English-as-a-Second-Language course to upgrade basic communication skills; voluntary language courses available for personal reasons.

(9) Correspondence Courses. These courses are offered through the Defense Activity for Non-Traditional Education Support (DANTES), including high school, college, and vocational/technical courses. Courses may be supplemented by local instruction in the ACES program.

b. OTHER ACES PROGRAM FUNCTIONS

(1) Career Advisory and Counseling (CAC). CAC programs are conducted by all ACES Centers. Counseling helps each active-duty soldier grow professionally by taking part in education programs and progressing toward their educational goals. The program ensures that each soldier is offered educational opportunity as advertised.

(2) Testing. Each ACES Center is required to provide an adequate testing facility and provide testing services for the programs conducted. Tests include academic proficiency, MOS proficiency, interest, aptitude, intelligence and general placement tests. Special emphasis is placed on DANTES examinations.

(3) On the Job Training (OJT). OJT is not normally provided under the Army's ACES program, thus this function is not discussed in this design guide.

c. STUDENTS

The ACES program primarily serves active duty military personnel, but may serve adult dependents, retired military personnel, and civilian employees on the installation when space is available.

(1) Enlisted Personnel. Soldiers without a high school diploma are urged to earn a high school diploma or state-issued high school equivalency by the end of the first enlistment and do one of the following: Have occupational skills certified which are learned through Army training and experience; or, acquiring an occupational skill through the skill development program.

(2) Officers. Warrant Officers are expected to complete an associate degree program or two school years of undergraduate study by the 15th year of service. The study must be in a career field related to

2-2 ACES: THE PLANNING BASE. (cont'd)

the soldiers specialty. Commisssioned Officers who lack a baccalaureate are encouraged to attain an undergraduate degree. Commissioned officers are urged to get a graduate degree. The degree may be in a discipline related to their specialty or in a shortage discipline determined by the Army Educational Requirements Board.

(3) Others; dependents, retirees, civilians, etc. Persons in this category are encouraged to make use of ACES programs, and will be admitted to programs in which space is available.

d. STAFF

For planning purposes the staff may be considered in two groups: administrative and counselor. These groups must be considered separately in terms of numbers of each type authorized. Specific staff functions and staffing levels are given in DA PAM 570-551. Instructors are normally contracted individually or from local and regional institutions, rather than being retained as permanent staff.

(1) Administrative. The administrative staff includes a director (Education Service Officer), administrators (Education Service Specialists), clerks (Administrative Specialists or Education Technicians), and typists. The administrative staff may also include a registrar, librarian and special program administrators. In some cases, individuals or institutions providing contracted services may also furnish administrative staff.

(2) Counselor. A staff of full-time counselors is authorized (one per 1,250 military personnel) to advise soldiers on the selection of courses and on career plans. AR 621-5, ACES, requires counselors to interview every new arrival at the installation during in-processing, and periodically thereafter, to assess the individual's educational background. Counselors are available to personnel throughout their stay on post.

e. INSTRUCTIONAL AIDS

(1) Audio-Visual. Films, slides, tape recorders, etc., are used to promote better learning by increasing the immediacy of experience. They are used extensively in language and reading instruction, and for teaching MOS-related material that involves the use of equipment under conditions that cannot be readily duplicated in the classroom.

(2) Self-Paced Learning. Programed instruction is frequently used, especially for MOS-related material. Students proceed at their own pace, and learning is broken down into small steps.

2-3 PLANNING REQUISITES AND DOCUMENTATION

The sequence of steps for planning is delineated in AR 415-15. Once a need for an ACES Center has been recognized by the installation, the building functional requirements and subsequent space needs

2-3 PLANNING REQUISITES AND DOCUMENTATION (cont'd)

must be established and documented along with the requirements of the site and future interior furnishings. This is the responsibility of the installation although assistance (using installation funds) may be obtained from the design agency if needed.

a. PROJECT DEVELOPMENT BROCHURES (PDB). Documentation is accomplished by first preparing a PDB as required by AR 415-20 and discussed in TM 5-800-3. Project requirements will be established in conjunction with the procedures and criteria in this guide.

b. DD FORM 1391 (MILITARY CONSTRUCTION PROJECT DATA). Preparation of DD Form 1391, with detailed justification paragraphs, is discussed in AR 415-15. Preparation of this form should be supported by the PDB previously prepared. All data entered on the DD Form 1391 must be carefully considered since project design must adhere to the requirements and estimates established thereon, as approved by HQDA. In preparing DD Form 1391, "DG 1110-3-112" should be entered under detailed justifications concerning criteria.

2-4 ANALYZING THE SITE

a. APPROVED GENERAL SITE PLAN. The site of the ACES Center must conform to the general site plan approved as part of the master plan of the installation. If the facility is not shown on the master plan, or if the shown location does not meet the current performance requirements of the using activity, then a new location must be selected and approval obtained in accordance with AR 210-20, Master Planning for Permanent Army Installations. Location is generally determined in response to the following factors.

(1) Central to the installation and close to library facilities for convenience of students and staff.

(2) Ready access from the main installation entrance for use by off-base personnel.

(3) Closer to enlisted than to officers' quarters since many enlisted may not have access to automobiles.

(4) Relatively quiet and uncontested area conducive to study.

(5) Soil characteristics and drainage to allow economical construction and siting.

(6) Sufficient real estate on site to permit buildings, parking, outdoor teaching areas related to vocational-training shops, access by service vehicles, and sufficient space for building expansion.

(7) Proximity to existing or planned non-ACES spaces which are usable for ACES functions, e.g., Arts and Crafts and Auto Crafts Centers.

(8) Proximity to dining facilities and other service facilities.

2-4 ANALYZING SITE (cont'd)

(9) Adaptable to barrier-free design for both able-bodied and handicapped persons.

b. PRELIMINARY SITE LAYOUT. Although a detailed site plan is not normally required for submission with the DD Form 1391, preparation of a site layout will assist in preliminary budgeting Tentative orientation of the building should take into consideration the following factors:

(1) Convenience of access for pedestrians, drivers of service vehicles.

(2) Direction of prevailing wind and sun angles.

(3) Land forms, grading, drainage, and tree coverage.

(4) Views (desirable and undesirable).

(5) Size, location and sufficiency of utility connections.

(6) Future expansion.

c. ESTIMATING SITE COSTS. Empirical cost estimating data are given in AR 415-17. Establishing the costs of site requirements is initially the most important consideration. Therefore, specific site requirements must be determined in conjunction with building requirements, and listed as separate items (Support Facilities) on DD Form 1391. The following list indicates typical items that should be considered.

Site preparation	Special foundations
Grading, paving (drives, parking and walks)	Fencing or walls
Demolition	Landscape planting
Water	Exterior electrical
Sanitary sewer	Communications
Gas	Signage

2-5 DEVELOPING THE BUILDING PROGRAM

a. MAXIMUM SPACE ALLOWANCES. Table 2-1 summarizes maximum space allowances for ACES Centers based on DOD Construction Criteria. Gross space includes maximum allowance for ACES activities, including Career Advisory and Counseling (CAC), to the outside dimensions of the building excluding central mechanical equipment space. Approximate mechanical space is a rough estimate of the additional space required to individually heat and air condition each size of building in a *moderate* climate. Corresponding figures obtained from determining the *actual space needs* as discussed in the following paragraphs, will identify the "gross space" and "mech space" requirements to be entered (Primary Facility) on DD Form 1391

2-5 DEVELOPING THE BUILDING PROGRAM (cont'd)

Table 2-1 Maximum Space Allowances

Military Strength	Authorized (1) No. Counselors	ACES (2)	CAC (3)	Gross Space	Approx Mech Space
251-1000	1	4125	500	4625	125
1001-1250	1	8700	500	9200	150
1251-2500	2	8700	580	9280	150
2501-3000	3	8700	660	9360	150
3001-3750	3	13500	660	14160	150
3751-5000	4	13500	740	14240	150
5001-6250	*5*	*16100*	*820*	*16920*	*150*
6251-7000	6	16100	900	17000	150
7001-7500	6	19800	900	20700	200
7501-8750	7	19800	980	20780	200
8751-10000	8	19800	1060	20860	200
10001-11250	*9*	*26300*	*1140*	27440	*300*
11251-12500	10	26300	1220	27520	300
12501-13750	11	26300	1300	27600	300
13751-15000	12	26300	1380	27680	300
15001-16250	13	31800	1460	33260	350
16251-17500	14	31800	1540	33340	350
17501-18750	15	31800	1620	33420	350
18751-20000	16	31800	1700	33500	350
20001-21250	*17*	*36300*	*1780*	*38080*	*400*
'21251-22500	18	36300	1860	38160	400
22501-23750	19	36300	1940	38240	400
23751-25000	20	36300	2020	38320	500
25001-26250	21	40500	2100	42600	500
26251-27500	22	40500	2180	42680	500
27501-28750	23	40500	2260	42760	500
28751-30000	24	40500	2340	42840	500
30001-40000	25-32	48000	2420-2480	50420-50980	600
40001-50000	33-40	55000	3060-3620	58060-58620	600
50001-60000	41-48	60000	3700-4260	63700-64260	650

Notes: (1) Based on DA PAM 570-551 guidance allowing 1 counselor per 1250 military strength.
(2) Allowed by DOD 4270. 1-M construction criteria.
(3) Based on DOD 4270. 1-M criteria allowing 500 SF for 1 counselor; 80 SF per each additional counselor.

2-5 DEVELOPING THE BUILDING PROGRAM (cont'd)

b. ACTUAL SPACE NEEDS. Actual space needs must be based on the requirements of the ACES Program projected over the next 10-years, and calculated in terms of the instructional space types needed, existing spaces available and compatible with such needs, and the requirements for staff and support. Actual space needs should be determined as follows:

(1) List type and number of authorized and assigned staff for the given military strength.

(2) List the typical semester courses and student enrollment anticipated within 10-years for the ACES program. Consideration must be given to changes in circumstances which might affect the types of courses offered as well as the projected enrollment.

(3) Assign each course to a specific instructional space type. Use the Individual Space Criteria in Chapter 4, paras 4-3 and 4-4 for academic and vocational training type spaces, respectively.

(4) For each instructional space type, make a table similar to Table 2-2 and find "c", the total number of hours per week that the space type is required. The maximum class size should be based on the occupant load specified for each type of instructional space as given in Chapter 4.

Table 2-2 Projected Space-Type Utilization

Space Type: *Classroom*

Course Designation	Typical Semester Enrollment (1) In Students	Maximum Class Size (2) In Students	Number Of Classes Required (ENRM'T ÷ Cl. Size)	Number Of Hours/Week EA Class Meets	Hrs/wk Space Required (Classes x HRS. EA)
English I	*95 (ENRM'T)*	*24 (Cl. Size)*	4 *(Classes)*	5 *(HRS. EA)*	*20*
English II	20	24	*1*	*3*	*3*
Geometry	*5*	24			
Math I	*22*	*24*	*1*	*3*	*3*
History	*48*	24	*2*	*3*	*6*
English Lit.	*23*	*24*	*1*	*3*	*3*
Accounting	*60*	*24*	*3*	*3*	*9*
Geography	*18*	*24*	*1*	*3*	*3*
Reading	*17*	*24*	*1*	4	*4*

Total Hrs/wk Space Type Required: C = *51*

Notes: (1) Based on List of Typical Semester Courses and student enrollment anticipated within 10-years.
(2) Based on occupant load data for each type of instructional space given in Chapter 4.

2-5 DEVELOPING THE BUILDING PROGRAM (cont'd)

(5) Find the number of spaces of that type required (N). Use the formula N = c/uh in which:

c = total hours per week space type is required as discussed in (4)

u = room utilization rate: the fraction of time a space would be used while the ACES Center is in operation; normally u = 0.8

h = hours per week that ACES Center will normally operate.

If N is a fraction or a mixed number, round up to the nearest whole integer. Completion of this step will indicate the number of each type of instructional space required. Normally, a minimum of one MOS Library and Self-Paced Instruction area, and one Testing Room will be required. However, the Testing Room may be doubly used as classrooms reducing the number of those spaces which would otherwise be required.

(6) Survey Existing Suitable Facilities. Existing spaces which are or can be made available for ACES activities should have convenient access to necessary support facilities (toilets, storage, etc.). These spaces should be listed in two groups:

(a) Usable Spaces: within 8 minutes walking distance (2,000 ft.) of other ACES activities especially instructional activities, to permit movement within 10-minute class break; with no major functional problems and compatible with space allocation and other criteria in Chapter 4; and with no major problems related to operation, supervision, or availability. An Arts and Crafts Center or Auto Craft Center, in close proximity, should be considered in this group, especially with regard to providing suitable shop spaces.

(b) Conditionally Usable Spaces: over 8 minutes walk to other ACES activities but usable for courses which do not require movement to and from rest of ACES Center; and/or with functional, operational, supervision, or availability problems that permit restricted use or require extensive renovation.

(7) Determine Requirements for New Instructional Space. Subtract existing usable spaces from required spaces. Be sure that the spaces which are subtracted are compatible with the Individual Space Criteria for each type of instructional space they are to replace. Multiply the number of spaces required for each space type times the NASF space allocated for that type in Chapter 4.

(8) Determine Space Requirements for Staff. Determine staff space requirements in relation to the staff authorized and the Individual Space Criteria for staff spaces in Chapter 4. Subtract existing usable spaces as determined according to (6). Be sure that existing facilities contemplated for staff use are compatible with effective ACES operation as certain staff offices may have to be centrally located.

2-5 DEVELOPING THE BUILDING PROGRAM (cont'd)

Again multiply the number of spaces required for each space type times the NASF space allocated for that type in Chapter 4.

(9) Determine Requirements for Support Spaces. Determine support space requirements according to the individual space allowances given in Chapter 4, para 4-5. Consider use of existing spaces as support spaces especially where existing spaces are to be used as instructional and/or staff spaces.

(10) Determine Total Net Space. Add support spaces to instructional (academic and vocational training) and staff spaces to determine total NASF of new space required.

(11) Determine Gross Space. Gross space is determined by adding the space needed for such things as circulation, building walls, and utility closets within the effective outside dimensions of the building to the total net space required. One half area must be included for exterior covered passageways, balconies and stairs. A *rough* estimate of GSF required may be obtained by multiplying total NASF by a net to gross factor of 1.15.

(12) Compare Requirement Against Allowable. Check required gross space against maximum gross space allowances in Table 2-1. If the required space does not exceed the allowable, enter the figure on the DD Form 1391. If required space exceeds the allowable, revise requirements to conform with allowable. In revising the requirements, the following methods should be considered:

(a) Use 5-year projected needs, or current needs, in lieu of 10-year needs.

(b) Plan for use of Conditionally Usable Spaces as discussed in (6) (b).

(c) Increase Room Utilization Rate "u" in conjunction with the formula discussed in (5).

(d) Examine the net to gross factor for possible reduction.

(13) Determine Mechanical Space. Refer to the Approximate Mechanical Space column in Table 2-1 for a rough estimate of mechanical space needed in relation to gross space required. The actual size should be estimated by a mechanical engineer taking into account the existence of central energy sources, solar applications, etc. Enter the figure obtained on a separate line of the DD Form 1391.

c. OCCUPANT CAPACITY. Once space needs have been determined, the occupant capacity, in number of students and staff, can be determined by adding the occupant loads given in Chapter 4 for each type of instructional and staff space, taking into account the number of spaces required, by multiplying the occupant load accordingly. This will provide the maximum peak load of students and staff which might be in the building at any given time, and can be used to indicate Design Capacity.

2-5 DEVELOPING THE BUILDING PROGRAM (cont'd)

d. EXAMPLE DETERMINATIONS OF NEEDS AND CAPACITY. Development of space needs is demonstrated in Chapter 6; in most detail in para 6-2. Space requirements and occupant capacity are tabulated for the given military strengths of 6,000, 10,500 and 21,000 persons in Tables 6-8, 6-10 and 6-12.

e. ESTIMATING BUILDING COSTS. Empirical cost estimating data are given in AR 415-17. The unit cost data shown in AR 415-17 include equipment and furnishings which are permanently built into or attached to the structure. The following list indicates typical items that should be estimated as part of the building cost.

Built-in counters, cabinets, sinks and shelving.

Drinking water coolers

Central PA and speaker system

Telephone, fire alarm and intercom system

Built-in laboratory furniture, hoods and vents

Built-in typing and tape playing decks

Built-in movable partitions

Built-in projection screens

Elevators and conveyors

Waste disposers

Floor and window coverings

Chalk boards, tack boards and display cases

Signage and graphics

Special features for the handicapped

Other items which are normally installed as a permanent part of the building.

2-6 RELATED FURNISHINGS AND EQUIPMENT

a. COORDINATING REQUIREMENTS. Principal items of furnishings and equipment are listed in Chapter 4 under each individual space, generally on the figures showing space layout. Furniture and equipment that are *portable* or *detached* from the structure must be furnished by the installation. These items will be funded from some other appropriation than construction, and such must be carefully coordinated to insure availability of furnishings and equipment when required. All related furnishings and equipment needs must be identified in conjunction with Planning the building in order to develop a totally integrated and useful facility; and in order to program funds and provide information on delivery schedules in relation to construction. In preparing DD Form 1391, plans for related furnishings and equipment must be described in the detailed justifications.

b. ESTIMATING FURNISHINGS AND EQUIPMENT COSTS. Items "on hand" meeting furnishings and equipment requirements should be listed separately from items that must be procured. Sources for selection of furnishings and equipment to be procured, are provided in the GSA Federal Supply Schedules, the Federal Prison Industries Schedule of Products and the general GSA supply catalog. These sources are mandatory, insofar as they meet requirements, and cost estimates should be based on prices therein *escalated* to time of actual procurement to meet the established delivery schedule. Quality factors relevant to the selection of furnishings are discussed in Chapter 3, para 3-5. The following list indicates typical items of equipment and furnishings that should be considered.

Audio-visual equipment, TV systems

Training equipment and instructional apparatus.

Desks, chairs, tables, study carrels

Lounge furniture

Service carts and equipment

Storage and filing cabinets

Microfilm equipment

Reproduction machines

Wall clocks; plug in

Outside furniture

Other items which are detachable or portable